150 volunteers from H.M.S. *Venus*, including the captain and all the officers, and we ourselves total six, namely, Sir Norman Lockyer, Mr. C. P. Butler and myself, and three volunteer observers, Lady Lockyer, Mr. Howard Payn, and Mr. Frank McClean.

We arrived here on the morning of August 10, having transhipped at Gibraltar to H.M.S. *Venus* about noon on August 8. The arrangements for transferring the 110 packing cases from ship to ship were all that could be desired, an Admiralty lighter and tug being in readiness on our arrival. By five o'clock in the afternoon we were steaming away towards our destination, leaving behind us that great pile of rock, which eventually became a dim speck on the horizon.

Needless to say, the conversations in the captain's cabin, in the wardroom, and in many other parts of the ship were concentrated on eclipse matters, and this culminated in a lecture which I was requested to give to the whole available ship's company. The keenness displayed was universal, and the following day volunteers were called for to assist in the work for the eclipse, and, as I have previously mentioned, they now total 150. The same evening Sir Norman Lockyer gave a lecture, which increased, if possible, the keenness previously displayed.

On our arrival at Palma, which, by the way, is situated in a beautiful bay with an excellent anchorage, the ship was boarded by numerous officials after the customary salutes had been exchanged between the ship and the fort. Amongst those who came on board was our friend Mr. Howard Payn, who had preceded us in order to fix on a suitable site for our camp, to arrange for local labour and material, and to smooth things generally for us. The very admirable way in which this difficult and delicate task was accomplished by him in conjunction with Mr. Roberts, the British Consul at Barcelona, could not be surpassed, and all the members of the expedition are unanimous in singing their praises. For the expedition to Spain in 1900 Mr. Payn rendered a similar service, and on that occasion the arrangements he made were all that could be desired.

On the afternoon of our arrival at Palma, Sir Norman Lockyer and Captain Eyres, in the company of the British Vice-Consul, Mr. Bosch, paid some official visits, and afterwards the site selected by Mr. Payn was visited. This site is an ideal spot for a large eclipse camp, being sufficiently close to a landing stage for boats, walled in, and perfectly open for astronomical observations in all directions. The ground, which is private property, has been kindly lent by the owner for the purposes of the eclipse observations, and the members of the expedition are extremely grateful for the use of such an admirable camping locality.

Indeed, kindness itself has been displayed in every direction. All the authorities of the island have laid themselves out to supply anything that is required, and already these offers have been accepted in several ways.

On the early morning of August 11 work at the camp began in earnest. The tents, loaned to us by the War Office, were taken ashore and erected, and later in the day the packing cases were landed and carried by carts to the ground. Parties from the ship soon began to be acquainted with the contents of the cases they had so delicately handled, and by the evening the large wooden structure composing the dark room and the camera end of the prismatic reflector, and also the siderostats and cœlostat huts, were nearly all erected and covered. While this work was in progress, meridian lines were being pegged out and the positions for the concrete pillars fixed.

The erection of the piers for the instruments commenced on the following day, and so soon as these were completed the instruments which were to be placed on them were put together and set up.

At the time of writing (August 18, 10 p.m.) great progress has been made; most of the instruments are nearly erected, some are in approximate adjustment, while they are now all under canvas, the coverings having been set up in truly nautical style.

To gain some idea of the work undertaken, it may be mentioned that the larger instruments include a prismatic reflector of 76 feet focal length, a 6-inch three-prism prismatic camera, two coronagraphs (one 16 feet focal length) and an objective grating camera worked in connection with one cœlostat, a triple camera of 3-inch aperture and 12 feet focal length for photographing the eclipsed sun in colours, and a $3\frac{1}{2}$-inch coronagraph worked equatorially. Already each instrument has a party from the ship to assist in working it efficiently, and these are daily in the camp to render aid when necessary.

In addition to the above-mentioned assistants for the instruments, there are several other pieces of work which are being taken in hand. Thus the disc party has already erected discs of various sizes on imposing structures on the east side of the ground. Further, there are groups of observers for sketching the corona without discs, making star observations, recording the colours of the corona and landscape, observing the shadow-bands and sweep of the shadow, making meteorological observations, &c.

These and other parties are daily being drilled to render them as efficient as possible, and there is every hope that eclipse day will find them skilled and accurate observers.

We are, however, rather doubtful as to the kind of weather that will be experienced here on the eventful day. So far, the chances have been in our favour, but partially clouded skies are more common than one would like to see. A sharp thunderstorm broke over the town on the early morning of August 17, and rain fell in torrents. Fortunately there was no wind, and no damage was done. Those acquainted with the local weather conditions cheer us up by forecasting fine weather, but clouds are far more frequent than one would wish them, and the prospects are not nearly so good as they were in India in 1898 or Spain in 1900. In less than a fortnight's time our fate will be sealed.

In addition to our party, numerous other observers of different nationalities are taking or have taken up their stations in the neighbourhood of the town.

WILLIAM J. S. LOCKYER.

FIRST INTERNATIONAL CONGRESS OF ANATOMISTS.

THE first meeting of the Congrès fédératif international d'Anatomie was held in Geneva, and commenced on the morning of Sunday, August 6, by the opening of an exhibition of specimens and appliances illustrating recent progress in anatomy. The congress closed on the evening of Thursday, August 10, when three hundred members and adherents of the congress were entertained by the city of Geneva to an official banquet. The congress represented a conjoint meeting of the five leading anatomical societies—the Anatomical Society of Great Britain and Ireland, Anatomische Gesellschaft, Association des Anatomistes, Association of American Anatomists, and the Unione Zooligica Italiana. Almost every country was represented. Switzerland itself contributed more than 100 members, France 66, Germany and Austria 36, Great Britain

and Colonies 23, Italy 11, America 3, and other countries 16. The largest contributors to the proceedings of the congress, however, were the Germans; out of a total of 117 communications, 32 were made by them, 31 by the French, 18 by the British, 15 by the Swiss, 8 by Italians, 5 by Swedes, and 2 by Americans.

From every point of view the congress was a success. Anatomy is peculiarly susceptible of international treatment, the subjects for description and discussion being concrete and capable of direct demonstration. The language difficulty certainly hindered a free discussion on more than one occasion; for instance, on the second day, a speaker, after giving his communication in French, listened most attentively to a vigorous criticism in German, and, bowing profoundly, replied, "Je ne comprends pas l'allemand." With an agenda list overloaded with 117 communications, there was a grave risk of disorganisation. Thanks to the complete arrangements made by the committee of organisation, presided over by Prof. A. Èternod, of Geneva, and to the perfect arrangement of business by the president of the secrétariat, Prof. von Bardeleben, the proceedings of the congress made an even and steady progress. The success of the congress must also be ascribed to Prof. Nicholas, of Nancy, secretary of the French society; English members were indebted to Prof. Symington, president of the British society, and to Dr. Christopher Addison, its secretary. Each day's work was divided into two parts; the morning was devoted to papers, ten minutes being allowed for each communication, and three minutes to any member who wished to criticise; the afternoon was set aside for exhibition of new specimens and demonstrations of the material on which the communications of the morning were based, and this was by far the most instructive and profitable part of the day's work. The Swiss cow-bell, employed by the president of each day's proceedings (for the president of each society acted in turn as chairman) to warn the speaker that he had reached the limit of his allotted time, bound the members of the congress by a common sense of humour and materially aided the success of the meeting. In spite of the *entente cordiale,* the British anatomists associated more closely with the German than with the French members of the congress—an association determined, for the greater part, by the fact that the Germans were the superior linguists.

With so extensive a programme, it is impossible in a report such as this to do more than note the more outstanding communications. Making every allowance for prejudice of race, the first place, both in importance of results and excellence of technique, must be assigned to the contributions made by Prof. J. T. Wilson, of Sydney University, who placed before the congress the results of a prolonged investigation into the developmental history of ornithorhynchus made by his colleague and collaborator, J. P. Hill, and by himself. With the material now at their command they will be able to write a full and precise account of the development of the monotremes and throw a great deal of light on mammalian morphology. The photograph of an ornithorhynchus egg, in the eight blastomere stage, was shown. Most remarkable of all were the specimens and photographs showing the early developmental phases of the central nervous system. The medullary plates, instead of folding over at an early date to form the neural tube as in mammals generally, remain exposed on the surface of the embryo and thus give a superb opportunity of studying the processes of segmentation and differentiation of the central nervous system. The cephalic part of the central nervous system is seen at first not to be differentiated into three parts, viz., hind-, mid-, and fore-brain, but into two, a hind part, or archencephalon, and a fore part, or deuterencephalon, under which the notochord terminates. The archencephalon shows four or five sharply demarcated neuromeres in front of the neuromere connected with the facial nerve (prefacial neuromeres), but Prof. Wilson detects in some of them traces of a subdivision. There are three post-facial neuromeres. By using embryos of Perameles and Dasyurus to supply blanks in the ornithorhynchus series, Wilson and Hill were able to show that the neural crest forms at first a continuous hem on the lateral margins of the medullary plates. That part of the neural crest corresponding to the prefacial neuromeres undergoes, relatively to the rest of the neural system, an enormous growth forming a plate of cells which was mistaken by Selenka in other marsupial embryos for a mass of mesoblast. The neural crest connected with the facial segment forms the acoustic ganglion; that with the post-facial neuromeres the glosso-vagal ganglion, the rest of the crest becoming differentiated into spinal ganglia.

It is within the memory of even the younger zoologists that ornithorhynchus was regarded at one time as a toothless mammal; then came the discovery by Poulton and by Stewart that teeth were present but remained embedded in the gums. Prof. Wilson was able to demonstrate in his series of embryos the presence of two dentitions—the development and absorption of a milk dentition and the formation of a permanent dentition—that discovered by Poulton and Stewart. Thus ornithorhynchus, so far as its dentition is concerned, takes its place with diphyodont mammals. Further, it was shown that each cusp of the permanent molars is preceded by a separate milk tooth—a powerful argument in favour of the evolution of molar teeth by the concrescence of single-cusped teeth. Photographs were exhibited of a reconstructed model of the skull of a fœtal ornithorhynchus which shows many aberrant and puzzling features. Other contributions to the embryology of monotremes were made by Prof. Keibel, of Freiburg (models showing the development of the urogenital apparatus of echidna), and to the embryology of marsupials by Dr. Für Bresslau, of Strassburg (preparations showing the development of the pouch of *Didelphys marsupialis*).

Two papers on the agenda list, one by Prof. von Bardeleben, of Jena, entitled, "Die Homologie des Unterkiefers in der Wirbeltierreihe," the other by Prof. Gaupp, of Freiburg, "Die Nicht-Homologie des Unterkiefers in der Wirbeltierreihe," brought again into prominence that much-debated problem—the origin and nature of the mammalian lower jaw. Bardeleben maintained that the lower jaw of a mammal was strictly the same structure as that of a reptile, and produced, as evidence of his contention, mandibles of marsupials and of human fœtuses in which there could be traced lines somewhat similar to the sutural lines to be seen in the reptilian mandible. Prof. Gaupp's paper was a clear and vigorous denial of Bardeleben's contentions. In Gaupp's opinion the temporo-maxillary joint of mammals was a new joint formed between the coronoid process of the reptilian jaw and the squamosal, and quite different from the mandibulo-quadrate joint of reptiles. His conclusions were largely based on a consideration of the relationship of muscles and nerves to these joints. The new mammalian joint was formed in the insertion of the pterygoideus externus, the end tendon of which be-

came the interarticular disc, as can be seen in echidna. By means of a model he demonstrated the manner in which a new joint could be developed without leading to a disturbance of the function of mastication, thus leaving the quadrate to form one of the auditory ossicles (hammer). It must be admitted that Gaupp's theory explains the embryological phenomena, and clearly met with general acceptance by the members of the congress. Prof. Eugen Fischer, of Freiburg, pointed out that the theory explained the presence of cartilage which he had found in the developing coronoid and condylar processes of the jaw in the mole and apes. A model of an early developmental stage of the human mandible was shown by Dr. Alexander Low, of Aberdeen, who also demonstrated a special formation of cartilage, independent of Meckels, in the condylar and coronoid processes of the human jaw—facts in favour of Gaupp's hypothesis. In the opinion of the writer of this report, this vexed question is not yet settled, nor is it likely to be so long as anatomists seek to derive the mammalian from the reptilian type of mandible.

Ten communications dealt with the structure or development of nerve cells. One of these was a paper by Prof. A. Donaggio, of Naples, "Il reticolo neurofibrillare della cellule nervosa dei Vertebrata (con demostrazione di preparati microscopici)," which revealed the energy and fire which Continental anatomists can throw into their work. Prof. Ramon y Cajal, of Madrid, also brought to the congress specimens to demonstrate the direct continuity of the neuro-fibrillar network of the nerve cell with the dendrites on the one hand and the axon on the other. He had placed his microscopes and specimens on a window-ledge of a passage leading to the laboratory where Donaggio gave an enthusiastic demonstration to an intent circle of listeners. Cajal suddenly joined the circle and gave a direct contradiction to some statement of Donaggio. A lively scene followed; Cajal fetched his microscopes and specimens one by one from the passage and placed them impetuously before Donaggio. It was hard to ascertain the exact point in dispute, but it was subsequently discovered that it was a matter of thickness of section, Cajal maintaining that Donaggio's sections were too thin to demonstrate the relations of the neuro-fibrillar network of the nerve cell, while, of course, Donaggio regarded those of his opponent as too thick. The dispute was amicably settled by the discovery that both meant the same thing, namely, that the neuro-fibrillar network of the nerve cell was directly continuous with dendrites and axon.

The question of the development and regeneration of nerve cells again came up for discussion. Dr. John Cameron showed excellent photomicrographs of the developing optic and spinal nerve fibres in amphibians and birds which he believed to be both of central and peripheral origin. Optic fibres he regarded as direct prolongations from the nuclei of the retinal ganglion cells. Specimens were shown by Dr. Alfred Kohn, of Prague, demonstrating that the cells which go to the formation of a nerve, both fibre and sheath, are derived from the central nervous system—a histological confirmation of Harrison's clever experiment. Prof. Barfurth, of Rostock, produced the results of experiments on regeneration of nerve fibres made by C. F. Walter, and concluded that the axis cylinders could be produced by the cells of the nerve sheath.

Dr. George Streeter exhibited a series of models showing the development of the acoustic ganglion in human embryos. The cochlear ganglion is separated from the vestibular ganglion during development, and the association of the cochlear nerve with the nerve to the posterior ampulla is merely fortuitous; Dr. Giuseppe Levi, of Florence, gave an account of the various forms of cells found in the ganglia of the spinal nerves in developing pigeons. In another communication this author showed that ganglion cells vary in size with the size of the animal in which they occur; other cells are not affected by the size of the animal. Dr. E. B. Jamieson exhibited an excellent series of dissections of the brain, showing how various nerve tracts, usually seen only in section, can be demonstrated in their complete extent by means of scalpel and forceps.

Several contributions were made to our knowledge of blood corpuscles. Dr. T. H. Bryce gave an account of the development of the thymus gland in Lepidosiren, and showed that leucocytes were present before this gland was developed, and that, therefore, Beard's theory of the thymus being the primary source of leucocytes could not be entertained. Weidenreich, of Strassburg, traced the origin of all forms of white blood corpuscles from a common mononuclear cell, which was similar to, if not identical with, connective tissue corpuscles. With this conclusion Dr. Bryce agreed. Prof. Jolly, of Paris, described the formation of the mammalian red blood corpuscle by the gradual absorption and disappearance of the nucleus, not by an extrusion as is usually supposed. A research into the changes in the thymus gland which take place with age led Prof. Hammar, of Upsala, to conclude that the lymphoid tissue of that gland reached its maximum development in the years of puberty. Analogous results were obtained by Dr. R. J. A. Berry and Dr. Lack, of Edinburgh, regarding the development of the lymphoid tissue of the vermiform appendix. Using the average number of lymphoid follicles seen in sections of the appendix as an index of the development of the lymphoid tissue, they concluded that the maximum number (7) was found about the twentieth year, every subsequent decade leading to a decrease in the number of follicles.

Very few of the papers dealt with the naked-eye structure of the human body, or had a direct bearing on the problems which interest the surgeon or clinician—a very remarkable fact when one considers that the vast majority of the members of the congress are teachers of medical students. To this limited group of communications may be assigned the paper by Prof. Symington on the relations of the deeper parts of the brain to the surface and Prof. Cunningham's further observations on the form of the stomach, with special reference to hour-glass stomach. Papers belonging to this section were given by Chaine, Ledouble, Broman, Delmas, Gilis, Steida, and Poirier.

Contributions to physical anthropology were also few in number. Dr. Wright, of Birmingham, dealt with the characters of the men buried in the round barrows of Yorkshire, and found that they were identical with the men obtained from prehistoric graves in the neighbourhood of Fribourg, Lussane, and Berne. Englishmen of to-day are rather longer-headed than the men who were buried in the round barrows of Yorkshire, a fact which Dr. Wright explained by the invasion and intermixture of the long-headed Scandinavians with the men of the round barrow age. Prof. Eugen Fischer dealt with the deposit of pigment beneath the conjunctiva. It occurs in mammals generally, and in all primates and races of men save Europeans, in whom the sub-conjunctival tissue is free from pigment except under certain pathological conditions.

Some very remarkable specimens—showing exqui-

site technique—of the maturation stages in the ovum of the bat were placed before the congress by Prof. van der Stricht. Equally fine specimens, showing the manner in which the zona radiata is formed round the ripening egg of the rabbit, were shown by Regaud and Petitjean, of Lyons University. Their specimens showed that the zona radiata of the ovum is fibrillar in structure, and that the fibrils are arranged in an inner and outer zone. The fibrils are formed in the intercellular protoplasm in which the cells of the Graafian follicle are embedded. It will be thus seen that the zona radiata is not formed from, but deposited on, the ovum. Prof. Êternod, of Geneva, dealt with the manner in which the human ovum becomes implanted in the uterus, and the subdivision of the archenteron into the cavity of the amnion, the neurenteric canal and alimentary tract.

If one may judge from the nature of several contributions to this congress, there is a decided tendency to break down the barriers that separate the methods of the anatomist from those of the physiologist. Three communications dealt with results obtained by experiment on living animals. Prof. Sano, of Antwerp, by removing groups of muscles from the limbs and studying the subsequent changes in the motor cells of the spinal cord, sought to determine the position of the various motor centres in the cord. Prof. Tricomi, of Messina, used a somewhat similar method in investigating the paths of auditory impulses.

The members of the congress took part in the dedication of a monument to the memory of Prof. Hermann Fol, who set sail from Havre in his yacht, *l'Aster,* in the spring of 1892 to investigate the fauna of the Mediterranean. From the day he sailed until now not a single trace has been discovered of ship or crew. The members of the congress were lavishly entertained by Madame Fol. The congress placed a wreath on the bust of the Swiss physiologist Servetus, who discovered the pulmonary circulation in the sixteenth century, and was burned at the stake by Calvin because, so it is said, he denied the existence of the Trinity. A wreath was placed by the British section of the congress on the spot where he was burned, this gracious act being prompted by Prof. Dixon, of Trinity College, Dublin.

The congress was a social as well as a scientific success. An invitation from American anatomists to meet at Boston in 1907 was declined, as it was felt that at least a space of five years should intervene between each congress. A permanent committee for the organisation of the next congress was formed by the nomination of five men, one from each of the five affiliated societies. It is intended to bring out a bulletin containing the proceedings and transactions of the congress, to which purpose part of the sum (11,000 francs) raised by subscription in Geneva to meet the expenses of the congress will be devoted. When it becomes the turn of London to entertain this congress, it will not be found an easy matter to attain the standard of hospitality which has been set by Geneva.

PROF. T. R. THALÉN.

BY the death on July 27 at Upsala of Prof. Tobias Robert Thalén, Sweden has lost one of her most eminent physicists and teachers. He conducted investigations of great delicacy and value in the field of spectrum analysis, and was the assistant of A. J. Angström in much of his work. He also furnished valuable contributions to the knowledge of terrestrial magnetism, and devised ingenious methods of searching for iron-ore deposits. Born at Köping on December 28, 1827, he matriculated at the University of Upsala in 1849, where he graduated as Doctor of Philosophy in 1854. In 1856 he became lecturer on astronomy, and from 1856 to 1859 travelling scholarships enabled him to study in England, France, and Germany. In 1861 he was appointed assistant professor of physics at Upsala, and from 1869 to 1870 he was professor of physics at the Stockholm Technical School. In 1873 he was appointed professor of mechanics at Upsala, and in the following year was transferred to the chair of physics. This professorship he held until 1896.

The principal memoirs written by him dealt with the determination of lines in the solar spectrum (1860), researches on the magnetic properties of iron (1861), on the Fraunhofer lines (1866), spectrum analysis (1866), determination of the wave-lengths of metallic lines (1868), terrestrial magnetic observations in Sweden in 1869–71 and 1872–1882, researches on the spectra of metalloids (1875), the search for magnetic iron ore deposits (1877), and on the arc spectrum of iron (1885).

Prof. Thalén's researches on the spectra of metals and metalloids won for him wide renown, and are recognised as classical contributions to spectrum analysis. Partly in conjunction with Ångström and partly by himself he produced accurate and elaborate maps showing the wave-lengths of the lines in the spectra of many elements. He also made a careful examination of the absorption bands of iodine vapour, and engaged himself on the difficult problem of determining and properly assigning the lines in the spectra of bodies of the yttrium and cerium groups. At the period when these papers appeared, precise measurements were needed to settle several fundamental questions in spectrum analysis, and the researches in which Prof. Thalén took part were of great assistance in this connection. The revised list of the lines in the arc spectrum of iron, published in a memoir presented to the Royal Society of Upsala in 1885, is still a standard work of reference wherever investigations in spectrum analysis are carried on.

The magnetometer invented by Prof. Thalén for searching for magnetic iron ore deposits greatly facilitated the work of prospecting, and there is not a single iron mine of any consequence in Sweden where this instrument has not been used. It was described in a paper read by Mr. B. H. Brough before the Iron and Steel Institute in 1887. In appreciation of the value of this instrument, in 1874 the Swedish Association of Ironmasters awarded Thalen a gold medal; and in 1884 he received the Rumford medal of the Royal Society for his spectroscopic researches. He was a member of the Swedish Academy of Sciences, and an honorary member of numerous scientific societies, both in Sweden and other countries.

THE SOUTH AFRICAN MEETING OF THE BRITISH ASSOCIATION.

THE various sections of the British Association met at Cape Town for three days last week, when presidential addresses were delivered and reports and papers were read and discussed. We print two more of the presidential addresses this week, and, following our usual custom, shall give in subsequent numbers other addresses, as well as reports of the proceedings of the sections written by members attending the meeting in South Africa. It is only necessary now, therefore, to refer to matters of general interest connected with the meeting.

On August 17 a special graduation ceremony in